State of California AIR RESOURCES BOARD

EXECUTIVE ORDER U-R-1-86

Relating to Certification of New Heavy-Duty Off-Road Equipment Engines

CATERPILLAR, INC.

Pursuant to the authority vested in the Air Resources Board by Sections 43000.5, 43013 and 43018 of the Health and Safety Code; and,

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-45-9;

IT IS ORDERED AND RESOLVED: That the following Caterpillar, Inc. 1999 model-year engine, with rated power between 175 and 750 horsepower, and exhaust emission control systems are certified as described below for use in heavy-duty off-road equipment:

Typical Equipment Usage: Dozer and Industrial Equipment

<u>Fuel Type</u>: Diesel

Engine Family	Liters	(Cubic Inches)	Exhaust Emission Control Systems and Special Features
XCPXL10.5MRF	10.5	(644)	Turbocharger Smoke Puff Limiter

Engine models and codes are listed on attachments. Production engines shall be in all material respects the same as those for which certification is granted.

The total hydrocarbons (THC), carbon monoxide (CO), nitrogen oxides (NOx), and particulate matter (PM) certification exhaust emission standards, in grams per brake horsepower-hour (g/bhp-hr), and the opacity of smoke emission standards, in percent (%), during acceleration (Accel), lugging (Lug), and peak (Peak) modes, for this engine family are (Title 13, California Code of Regulations, Section 2423):

Exhaust Emissions (g/bhp-hr)			<u>Smoke</u>	Smoke Opacity (%)			
<u>THC</u>	<u>co</u>	<u>NOx</u>	<u>PM</u>	<u>Accel</u>	<u>Lug</u>	<u>Peak</u>	
1.0	8.5	6.9	0.4	20	15	50	

The THC, CO, NOx and PM exhaust emission certification values, in g/bhp-hr, and the opacity of smoke emission certification values, in percent (%), for this engine family are:

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Exhaust Emissions (g/bhp-hr)			Smc	Smoke Opacity (%)			
THC	<u>co</u>	<u>NOx</u>	<u>PM</u>	<u>Acce</u>	<u>Luq</u>	<u>Peak</u>	
0.4	0.8	5.7	0.1	13	1	33	

BE IT FURTHER RESOLVED: That the listed engine models comply with the "Exhaust Emission Standards and Test Procedures--Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2423) for the aforementioned model year.

BE IT FURTHER RESOLVED: That the listed engine models also comply with the "Emission Control Labels--1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines" (Title 13, California Code of Regulations, Section 2424) for the aforementioned model year.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the materials to demonstrate certification compliance with the Board's emission control system warranty provisions (Title 13, California Code of Regulations, Section 2425 et seq.).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

Executed at El Monte, California this _______day of December 1998.

R) B. Summerfield, Chief // Mobile Source Operations Division

LARGE ENGINE MODEL SUMMARY

EO: U-R-1-86

Manufacturer: GATERPILLAR INC	Process Code:	New Submission
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EPA Engine Family: _XCPXL10.5MRF________Manufacturer Family Name: ______NA.____

1.Engine Code	2.Engine Model	3.BHP@RPM (SAE Gross)	4.Fucl Rate: mm/stroke (2 peak HP (for diesel only)	5.Fuel Rate: (lbs/hr) @ pcak HP (for diesels only)	6.Torque @ RPM (SEA Gross)	7.Fuel Rate; mm/stroke@pesk torque	8.Fuel Rate: (lbs/fir)@peak torque	9.Emission Control
Note: Peak HP	and Peak Torque	fuel rates are	nominal values.	Due to establish			/www.ii./fisheek toudne	Device Per SAE J193
1 - Cert Engine	3306	225 @ 2000	132		ion engine avgs.	these fuel rates	may change.	
2	3306	215 @ 2200	120	88.5	752 @ 1400	15₫	72.6	EM, DI, TC, SPI
3	3306	200 @ 2200	107	88.8	753 @ 1400	153	71.8	EM, DI, TC, SPI
4	3306	200 @ 2000	112	79.4	658 @ 1400	127	59.8	EM, DI, TC, SPI
5	3306	210 @ 2000	119	75.6	652 @ 1400	131	61.5	EM, DI, TC, SPI
6	3306	190 @ 2000	107	79.5	687 @ 1400	143	66.7	EM, DI, TC, SPI
7	3306	200 @ 1800		72.0	619 @ 1400	123	58.1	
8	3306	200 @ 1800	122 122	73.8	732 @ 1200	149	60.2	EM, DI, TC, SPI
9	3306	175 @ 1800	108	73.8	710 @ 1200	145	58.7	EM, DI, TC, SPI
13	3306	206 @ 1900		65.6	637 @ 1200	132	53.4	EM, DI, TC, SPI
15	3306	185 @ 1900	126	80,4	695 @ 1200	148	59.5	EM, DI, TC, SPI
16	3306	198 @ 1900	112	71.7	623 @ 1200	128	51.5	EM, DI, TC, SP
17	3306	196 @ 1900	121	77.4	687 @ 1200	146	58.8	EM, DI, TC, SPI
18	3306	209 @ 1900	119	76.2	677 @ 1200	143	57.9	EM, DI, TC, SPI
19	3306	206 @ 1900	128	81.8	723 @ 1200	154	62.2	EM, DI, TC, SPI
21	3306		126	80.6	720 @ 1200	152	61.3	EM, DI, TC, SPI
22	3306	179 @ 1900	108	68.7	611 @ 1200	125		EM, DI, TC, SPL
24	3306	176 @ 1900	106	67.5	601 @ 1200	123	50.5	EM, DI, TC, SPL
25	3306	179 @ 1900	108	68.7	611 @ 1200	125	49.7	EM, DI, TC, SPI
26		199 @ 1900	122	77.8	711 @ 1400		50.5	EM, DI, TC, SPL
27	3306	189 @ 1900	115	73.5	676 @ 1400	146	68.5	EM, DI, TC, SPL
28	3306	179@1900	110	70,4	640 @ 1400	139	65.5	EM, DI, TC, SPL
29	3306	179 @ 1800	114	68.9	644 @ 1400	130	61.3	EM, DI, TC, SPL
30	3306	179 @ 1900	110	70.4		134	62.9	EM, DI, TC, SPL
31	3306	189 @ 1800	118	71.7	640 @ 1400	130	61.3	EM, DI, TC, SPL
32	3306	189 @ 1900	115	73.5	679 @ 1400	141		EM, DI, TC, SPL
		194 @ 1800	122	74.1	676 @ 1400	139		EM, DI, TC, SPL
33		194 @ 1900	118	75.5	696 @ 1400	146		EM, DI, TC, SPL
34	3306	194 @ 2100	108	76.2	694 @ 1400	144		EM, DI, TC, SPL
					693 @ 1400	137		EM, DI, TC, SPL